REMARKS

In response to the Office Action of October 29, 2004, Applicants respectfully request reconsideration. Claims 1-42 were previously pending in this application. By this amendment, Applicants are canceling claims 1-23, 28 and 33 without prejudice or disclaimer. Claims 24, 29, 30-32, 34, 35-37 and 42 have been amended. New claims 43-60 have been added. As a result, claims 24-27, 29-32 and 34-60 are pending for examination, with claims 24, 32, 37, 46, 53 and 54 being independent. No new matter has been added.

In the Office Action, it is evident that the Examiner did not consider a second preliminary amendment, mailed February 21, 2002. A copy of the second preliminary amendment and the return postcard are enclosed. In the second preliminary amendment, claims 1-23 were amended, and claims 24-42 were added. The Examiner is requested to confirm that the second preliminary amendment is of record.

Claim Objections

The Examiner objected to claims 8, 15 and 23 for failing to include punctuation and for containing typographical errors. Claims 8, 15 and 23 have been canceled. Accordingly, withdrawal of the objection to claims 8, 15 and 23 is respectfully requested.

Rejections under 35 U.S.C. §112

The Examiner rejected claims 1-8 and 18-23 under 35 U.S.C. §112 because the term "relatively short wires" in claim 1 is a relative term that renders the claim indefinite and because claim 18 contains product and process limitations. Claims 1-8 and 18-23 have been canceled. Accordingly, withdrawal of the rejection of claims 1-8 and 18-23 under 35 U.S.C. §112 is respectfully requested.

Claims 24 and 38 contain the term "relatively short wires". A definition of the term "relatively short wires" may be found in the Specification (page 2, lines 1 and 2). Therefore, it is respectfully asserted that the term "relatively short wires" is not indefinite.

Rejections Under 35 U.S.C. §102

The Examiner rejected claims 1, 3, 4, 9-11, 16, 18 and 19 under 35 U.S.C. §102(e) as being anticipated by Bremer et al. (U.S. Patent No. 6,647,058).

Claims 1, 3, 4, 9-11, 16, 18 and 19 have been canceled. Accordingly, withdrawal of this rejection is respectfully requested.

Claims 24, 32, and 37 have been amended to include limitations similar to the limitations of canceled claim 12, which was indicated to be allowable. New claims 46, 53 and 54 also contain limitations similar to the limitations of allowable claim 12. Therefore claims 24, 32, 37, 46, 53 and 54, as well as the claims that depend therefrom, patentably distinguish over the prior art of record.

Rejections Under 35 U.S.C. §103

The Examiner rejected claims 2 and 17 under 35 U.S.C. §103(a) as being unpatentable over Bremer et al. (U.S. Patent No. 6,647,058).

Claims 2 and 17 have been canceled. Accordingly, withdrawal of this rejection is respectfully requested.

CONCLUSION

A Notice of Allowance is respectfully requested. The Examiner is requested to call the undersigned at the telephone number listed below if this communication does not place the case in condition for allowance.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicants hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed

check, please charge any deficiency to Deposit Account No. 23/2825.

Respectfully submitted,
Frank SJÖBERG et al., Applicants

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Docket No.: S1022.80668US00
Date: January 31, 2005
x01/29/05x

Serial No 09/856,438 File No. S1022/8668 By: RJP:jms

Title: IMPROVEMENTS IN, OR RELATING TO, VDSL TRANSMISSION ...

Application of FRANK STÖBERG ET AL. WGS Date: NDD

The U.S. PTO Mail Room acknowledges receipt of the following on the date stamped hereon:

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[ ] Other ______________________________

DATE MAILED 2-21-02

ATTORNEY'S DOCKET NO. S1022/8668

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Frank Sjöberg et al.
Serial No:	09/856,438
Filed:	May 21, 2001
For:	IMPROVEMENTS IN, OR RELATING TO, VDSL TRANSMISSION SYSTEMS
Examiner:	Unassigned
Art Unit:	2631

Certificate of Mailing

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to Box Fee Amendment, Commissioner for Patents, Washington, D.C. 20231 on the 21 day of February, 2002.

Judith M. Schultz
Judith M. Schultz

BOX FEE AMENDMENT
COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

Sir:

Transmitted herewith is a Second Preliminary Amendment in the above-identified application.

The fee has been calculated as shown below:

CLAIMS AS AMENDED

	Claims Remaining After Amendment		Highest No. Previously Paid For		Present Extra		Rate	Additional Fee
TOTAL CLAIMS	42	-	23	=	19	X	$ 18	= $ 342.00
INDEP. CLAIMS	6	-	3	=	3	X	$ 84	= $ 252.00
MULTIPLE DEPENDENT CLAIM								= $ 0.00
TOTAL ADDITIONAL FEE FOR THIS AMENDMENT								= $ 594.00

[X] A check in the amount of $ 594.00 is attached.
[X] Return Postcard
[X] Please charge any additional fees or credit overpayment to Deposit Account 23/2825. A duplicate of this sheet is enclosed.

William R. McClellan

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Attorneys of Record

Docket No. S1022/8668
Dated: February 26, 2002
xNDD

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: SJÖBERG, Frank, WILSON, Sarah Kate, NILSSON, Rikard, BENGTSSON, Daniel, ISAKSSON, Mikael, NORDSTROM, Tomas, ÖDLING, Per, BAHLENBERG, Gunnar, JOHANSSON, Magnus, OLSSON Lennart, OKVIST, Sven-Göran
Serial No.: 09/856,438
Filing Date: May 21, 2001
For: IMPROVEMENTS IN, OR RELATING TO, VDSL TRANSMISSION SYSTEMS

Examiner: Unassigned
Art Unit: 2631

Certificate of Mailing

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Judith M. Schultz
Judith M. Schultz

Commissioner for Patents
Washington, D.C. 20231

SECOND PRELIMINARY AMENDMENT

Sir/Madam:

Prior to examination, please amend the above-identified application as follows:

IN THE CLAIMS

Please rewrite the claims as shown.

1. (Twice amended) A very high rate digital subscriber line transmission system having a plurality of modems operating on an access network in which at least some of said modems operate on wires of different lengths and in which there is a target bit rate for each modem, wherein modems on relatively short wires have control means for reducing their transmit power so that far end cross talk produced by said modems is reduced, enabling modems on substantially longer wires to transmit at higher bit rates.

2. (Twice amended) A very high rate digital subscriber line system, as claimed in claim 1, wherein said relatively short wires are less than or equal to 1,000 meters long and said substantially longer wires are more than 1,000 meters long.

5. (Twice amended) A very high rate digital subscriber line system, as claimed in claim 1, wherein the control means, associated with a given modem connected to a given wire, is adapted to produce an energy loading E_k for the k^{th} sub-carrier given by:

$$E_k = \lambda \frac{n_k}{F_k}$$

where n_k is the background noise on sub-carrier k, F_k is the far end cross talk transfer function for said given wire and λ is a constant, λ being adjusted so that

$$R = \sum_{k-0}^{N-1} \log_2 (1 + \frac{E_k}{\Gamma(n_k + Fext_k)\Gamma_M})$$

where $Fext_k$ is far end cross talk from other very high rate digital subscriber line modems, Γ is a signal to noise ratio-gap, Γ_M is a system margin and R is a target bit rate per discrete multitone frame.

6. (Twice amended) A very high rate digital subscriber line system, as claimed in claim 5, wherein said far end cross talk transfer function F_k is given by:

$$F_k = K \mid H_k \mid^2 f_k{}^2 d$$

where H_k is a transfer function for a given wire, f_k is a frequency for subcarrier k, d is the length of wire and K is a constant.

7. (Twice amended) A very high rate digital subscriber line system, as claimed in claim 5, wherein E_k is always less than or equal to a maximum allowable power spectral density-level, PSD_{max} for said very high rate digital subscriber line system.

8. (Twice amended) A very high rate digital subscriber line system, as claimed in claim 7, wherein:

$$E_k = \lambda \frac{n_k}{F_k} \quad \text{for} \quad \lambda \frac{n_k}{F_k} < PSD_{\max}$$

and

$$E_k = PSD_{\max} \quad \text{for} \quad \lambda \frac{n_k}{F_k} \geq PSD_{\max}.$$

9. (Twice amended) A modem for use with a very high rate digital subscriber line transmission system having a plurality of modems operating on an access network in which at least some of said modems operate on wires of different lengths, said modem having a target bit rate wherein said modem includes control means for reducing its transmit power so that far end cross talk produced by said modem is reduced.

12. (Twice amended) A modem, as claimed in claim 9 wherein said modem is connected to a wire, and in that said control means is adapted to produce an energy loading E_k for the kth sub-carrier given by:

$$E_k = \lambda \frac{n_k}{F_k}$$

where n_k is a background noise on sub-carrier k, F_k is a far end cross talk transfer function for said wire and λ is a constant, λ being adjusted so that

$$R = \sum_{k-0}^{N-1} \log_2 \left(1 + \frac{E_k}{\Gamma(n_k + Fext_k)\Gamma_M}\right)$$

where $Fext_k$ is a far end cross talk from other very high rate digital subscriber line modems, Γ is a signal to noise ratio-gap, Γ_M is a system margin and R is a target bit rate per discrete multitone frame.

13. (Twice amended) A modem, as claimed in claim 12, wherein said far end cross talk transfer function F_k is given by:

$$F_k = K \mid H_k \mid^2 f_k^{\,2} d$$

where H_k is a transfer function for the given wire, f_k is a frequency for subcarrier k, d is a length of the wire and K is a constant.

14. (Twice amended) A modem, as claimed in claim 12, wherein E_k is always less than a maximum allowable power spectral density-level for very high rate digital subscriber line.

15. (Twice amended) A modem, as claimed in claim 14, wherein:

$$E_k = \lambda \frac{n_k}{F_k} \quad \text{for} \quad \lambda \frac{n_k}{F_k} < PSD_{\max}$$

and

$$E_k = PSD_{\max} \quad \text{for} \quad \lambda \frac{n_k}{F_k} \geq PSD_{\max}.$$

17. (Twice amended) A method as claimed in claim 16, wherein said relatively short wires are less than or equal to 1,000 meters long, and wherein said substantially longer wires are more than 1,000 meters long.

20. (Twice amended) A method as claimed in claim 16, including producing an energy loading E_k for the k^{th} sub-carrier given by:

$$E_k = \lambda \frac{n_k}{F_k}$$

where n_k is the background noise on sub-carrier k, F_k is the far end cross talk transfer function for said given wire and λ is a constant, λ being adjusted so that

$$R = \sum_{k+0}^{N-1} \log_2 (1 + \frac{E_k}{\Gamma(n_k + Fext_k)\Gamma_M})$$

where $Fext_k$ is a far end cross talk from other very high rate digital subscriber line modems, Γ is a signal to noise ratio -gap, Γ_M is a system margin and R is a target bit rate per discrete multitone frame.

21. (Twice amended) A method, as claimed in claim 20, wherein said far end cross talk transfer function F_k is given by:

$F_k = K\,|\,H_k\,|^2\ f_k{}^2 d$ where H_k is a transfer function for the given wire, f_k is a frequency for sub-carrier k, d is a length of the wire and K is a constant.

22. (Twice amended) A method, as claimed in claim 20, wherein E_k always less than a maximum allowable power spectral density-level, PSD_{max} for said very high rate digital subscriber line system.

23. (Twice amended) A method, as claimed in claim 22, wherein:

$$E_k = \lambda \frac{n_k}{F_k} \quad \text{for} \quad \lambda \frac{n_k}{F_k} < PSD_{\max}$$

and

$$E_k = PSD_{\max} \quad \text{for} \quad \lambda \frac{n_k}{F_k} \geq PSD_{\max}.$$

24. (New) For a very high rate digital subscriber line transmission system having a plurality of modems operating on an access network in which at least some of said modems operate on wires of different lengths and in which there is a target bit rate for each modem, a method of redistributing available bandwidth which includes reducing the transmit power of modems on relatively short wires so that far end cross talk produced by said modems is reduced, enabling modems on substantially longer wires to transmit at higher bit rates.

25. (New) A method as claimed in claim 24, wherein said relatively short wires are less than or equal to 1,000 meters long, and wherein said substantially longer wires are more than 1,000 meters long.

26. (New) A method as claimed in claim 24, including distributing power over an available frequency band so that said target bit rate is achieved.

27. (New) A method, as claimed in claim 24, including modulating transmitted data using discrete multitone.

28. (New) A method as claimed in claim 24, producing an energy loading E_k for the k^{th} sub-carrier given by:

$$E_k = \lambda \frac{n_k}{F_k}$$

where n_k is the background noise on sub-carrier k, F_k is the far end cross talk transfer function for said given wire and λ is a constant, λ being adjusted so that

$$R = \sum_{k+0}^{N-1} \log_2 (1 + \frac{E_k}{\Gamma(n_k + Fext_k)\Gamma_M})$$

where $Fext_k$ is a far end cross talk from other very high rate digital subscriber line modems, Γ is a signal to noise ratio -gap, Γ_M is a system margin and R is a target bit rate per discrete multitone frame.

29. (New) A method, as claimed in claim 28, wherein said far end cross talk transfer function F_k is given by:

$$F_k = K \mid H_k \mid^2 f_k{}^2 d$$

where H_k is a transfer function for the given wire, f_k is a frequency for sub-carrier k, d is a length of the wire and K is a constant.

30. (New) A method, as claimed in claim 28, wherein E_k is always less than a maximum allowable power spectral density-level, PSD_{max} for said very high rate digital subscriber line system.

31. (New) A method as claimed in claim 30, wherein:

$$E_k = \lambda \frac{n_k}{F_k} \quad \text{for} \quad \lambda \frac{n_k}{F_k} < PSD_{\max}$$

and

$$E_k = PSD_{\max} \quad \text{for} \quad \lambda \frac{n_k}{F_k} \geq PSD_{\max}.$$

32. (New) For a very high rate digital subscriber line transmission system having a plurality of modems operating on an access network in which at least some of said modems operate on wires of different lengths and in which there is a target bit rate for each modem, a method of constraining transmission energy of at least one modem on a relatively short wire, by applying power back-off so as to force said transmission energy loading toward said target bit rate, in order to reduce far end cross talk produced by said modem, enabling modems on substantially longer wires to transmit at higher bit rates.

33. (New) A method as claimed in claim 32, producing an energy loading E_k for the k^{th} sub-carrier given by:

$$E_k = \lambda \frac{n_k}{F_k}$$

where n_k is the background noise on sub-carrier k, F_k is the far end cross talk transfer function for said given wire and λ is a constant, λ being adjusted so that

$$R = \sum_{k+0}^{N-1} \log_2 \left(1 + \frac{E_k}{\Gamma(n_k + Fext_k)\Gamma_M}\right)$$

where $Fext_k$ is a far end cross talk from other very high rate digital subscriber line modems, Γ is a signal to noise ratio -gap, Γ_M is a system margin and R is a target bit rate per discrete multitone frame.

34. (New) A method, as claimed in claim 33, wherein said far end cross talk transfer function F_k is given by:

$$F_k = K \mid H_k \mid^2 f_k^{\,2} d$$

where H_k is a transfer function for the given wire, f_k is a frequency for sub-carrier k, d is a length of the wire and K is a constant.

35. (New) A method, as claimed in claim 33, wherein E_k always less than a maximum allowable power spectral density-level, PSD_{max} for said very high rate digital subscriber line system.

36. (New) A method, as claimed in claim 35, wherein:

$$E_k = \lambda \frac{n_k}{F_k} \quad \text{for} \quad \lambda \frac{n_k}{F_k} < PSD_{max}$$

and

$$E_k = PSD_{max} \quad \text{for} \quad \lambda \frac{n_k}{F_k} \geq PSD_{max} .$$

37. (New) A very high rate digital subscriber line system, comprising:

a station;

a first modem connected to the station with a wire; and

a second modem connected to the station with a wire, and comprising means for controlling transmission output to approach a target bit rate to effectively distribute overall system bandwidth.

38. (New) The system as claimed in claim 37, wherein the means for controlling transmission output utilizes a relatively short wire to access the system.

39. (New) The system as claimed in claim 38, wherein the relatively short wire is a wire less than or equal to 1000 meters long.

40. (New) The system as claimed in claim 37, wherein the first modem utilizes a relatively long wire to access the system.

41. (New) The system as claimed in claim 40, wherein the relatively long wire is a wire more than 1000 meters long.

42. (New) The system as claimed in claim 37, wherein the means for controlling transmission output reduces far-end crosstalk.

REMARKS

This is a second preliminary amendment in which claims have been amended for clarification purposes, and claims have been added to further define the Applicants' contribution to the art. Favorable action is hereby earnestly solicited.

Respectfully submitted,

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Attorneys for the Applicants

Attorney's Docket No. S1022/8668
Dated: February 20, 2002

MARKED-UP CLAIMS

1. (Twice amended) A very high rate digital subscriber line transmission system having a plurality of modems operating on an access network in which at least some of said modems operate on wires of different lengths and in which there is a target bit rate for each modem, wherein modems on relatively short wires have control means for reducing their transmit power so that far end cross talk produced by said modems is reduced, enabling modems on substantially longer wires to transmit at higher bit rates.

2. (Twice amended) A very high rate digital subscriber line system, as claimed in claim 1, wherein said relatively short wires are less than or equal to 1,000 [metres] meters long and said substantially longer wires are more than 1,000 [metres] meters long.

5. (Twice amended) A very high rate digital subscriber line system, as claimed in claim 1, wherein the control means, associated with a given modem connected to a given wire, is adapted to produce an energy loading E_k for the k^{th} sub-carrier given by:

$$E_k = \lambda \frac{n_k}{F_k}$$

where n_k is the background noise on sub-carrier k, F_k is the [[]far end cross talk transfer function for said given wire and λ is a constant, λ being adjusted so that

$$R = \sum_{k=0}^{N-1} \log_2 (1 + \frac{E_k}{\Gamma(n_k + Fext_k)\Gamma_M})$$

where $Fext_k$ is [a] far end cross talk from other very high rate digital subscriber line modems, Γ is a signal to noise ratio-gap, [Γ_m] Γ_M is a system margin and R is a target bit rate per discrete multitone frame.

6. (Twice amended) A very high rate digital subscriber line system, as claimed in claim 5, wherein said far end cross talk transfer function F_k is given by:

$$[F_k - K \backslash H_k \backslash^2 \int_k{}^2 d]$$

$$\underline{F_k = K \mid H_k \mid^2 f_k{}^2 d}$$

where H_k is a transfer function for a given wire, f_k is a frequency for subcarrier k, d is the length of wire and K is a constant.

7. (Twice amended) A very high rate digital subscriber line system, as claimed in claim 5, wherein E_k is always less than or equal to a [maximal] maximum allowable power spectral density-level, PSD_{max} for said very high rate digital subscriber line system.

8. (Twice amended) A very high rate digital subscriber line system, as claimed in claim 7, wherein:

$$E_k = \lambda \frac{n_k}{F_k} \quad \text{for} \quad \lambda \frac{n_k}{F_k} < PSD_{max}$$

and

$$[E_k - PSD_{max} \quad \text{for} \quad \lambda \frac{n_k}{F_k} \geq PSD_{max}]$$

$$\underline{E_k = PSD_{max} \quad \text{for} \quad \lambda \frac{n_k}{F_k} \geq PSD_{max}.}$$

9. (Twice amended) A modem for use with a very high rate digital subscriber line transmission system having a plurality of modems operating on an access network in which at least some of said modems operate on wires of different lengths, said modem having a target bit rate wherein said modem [has] includes control means for reducing its transmit power so that far end cross talk produced by said modem is reduced.

12. (Twice amended) A modem, as claimed in claim 9 wherein said modem is connected to a wire, and in that said control means is adapted to produce an energy loading E_k for the k^{th} sub-carrier given by:

$$E_k = \lambda \frac{n_k}{F_k}$$

where n_k is [the] a background noise on sub-carrier k, F_k is a far end cross talk transfer function for said wire and λ is a constant, λ being adjusted so that

$$R = \sum_{k+0}^{N-1} \log_2 \left(1 + \frac{E_k}{\Gamma(n_k + Fext_k)\Gamma_M}\right)$$

where $Fext_k$ is a far end cross talk from other very high rate digital subscriber line modems, Γ is a signal to noise ratio-gap, [Γ_m] Γ_M is a system margin and R is a target bit rate per discrete multitone frame.

13. (Twice amended) A modem, as claimed in claim 12, wherein said far end cross talk transfer function F_k is given by:

$$[F_k - K \backslash H_k \backslash^2 \int_k^2 d]$$

$$F_k = K\,|H_k|^2\, f_k^{\,2} d$$

where H_k is a transfer function for the given wire, f_k is a frequency for subcarrier k, d is a length of the wire and K is a constant.

14. (Twice amended) A modem, as claimed in claim 12, wherein E_k is always less than a [maximal] maximum allowable power spectral density-level for very high rate digital subscriber line.

15. (Twice amended) A modem, as claimed in claim 14, wherein:

$$E_k = \lambda \frac{n_k}{F_k} \quad \text{for} \quad \lambda \frac{n_k}{F_k} < PSD_{\max}$$

and

$$[E_k - PSD_{max} \quad \text{for} \quad \lambda \frac{n_k}{F_k} \geq PSD_{max}]$$

$$\underline{E_k = PSD_{max} \quad \text{for} \quad \lambda \frac{n_k}{F_k} \geq PSD_{max}.}$$

17. (Twice amended) A method as claimed in claim 16, [including] wherein said relatively short wires [being] are less than or equal to 1,000 [metres] meters long, and [by] wherein said substantially longer wires [being] are more than 1,000 [metres] meters long.

20. (Twice amended) A method as claimed in claim [15] 16, [whereby] including producing an energy loading $\underline{E_k}$ for the k[th] sub-carrier given by:

$$E_k = \lambda \frac{n_k}{F_k}$$

where n_k is the background noise on sub-carrier k, F_k is the far end cross talk transfer function for said given wire and λ is a constant, λ being adjusted so that

$$R = \sum_{k+0}^{N-1} \log_2 \left(1 + \frac{E_k}{\Gamma(n_k + Fext_k)\Gamma_M}\right)$$

where $Fext_k$ is a far end cross talk from other very high rate digital subscriber line modems, Γ is a signal to noise ratio -gap, [Γ_m] $\underline{\Gamma_M}$ is a system margin and R is a target bit rate per discrete multitone frame.

21. (Twice amended) A method, as claimed in claim 20, wherein said far end cross talk transfer function $\underline{F_k}$ [being] is given by:

$$[F_k - K \backslash H_k \backslash^2 \int_k^2 d]$$

$$\underline{F_k = K |H_k|^2 f_k^2 d}$$

where H_k is a transfer function for the given wire, f_k is a frequency for sub-carrier k, d is a length of the wire and K is a constant.

22. (Twice amended) A method, as claimed in [either] claim 20, [or 21,] wherein E_k always less than a [maximal] <u>maximum</u> allowable power spectral density-level, PSD_{max} for said very high rate digital subscriber line system.

23. (Twice amended) A method, as claimed in claim 22, wherein:

$$E_k = \lambda \frac{n_k}{F_k} \quad \text{for} \quad \lambda \frac{n_k}{F_k} < PSD_{max}$$

and

$$[\, E_k - PSD_{max} \quad \text{for} \quad \lambda \frac{n_k}{F_k} \geq PSD_{max} \,]$$

$$\underline{E_k = PSD_{max} \quad \text{for} \quad \lambda \frac{n_k}{F_k} \geq PSD_{max}}.$$